

Breeding Biology of the Himalayan Rubythroat, *Erithacus pectoralis* (Gould) in the Tien Shan¹

BY

E. I. GAVRILOV AND A. F. KOVSHAR

Institute of Zoology, Alma-Ata, U.S.S.R.

(Communicated by Dr. Sálím Ali)

(With two plates)

The Himalayan Rubythroat [*Erithacus pectoralis* (Gould)] is a characteristic species of the subalpine belt of the Tien Shan. Its biology has not been satisfactorily studied hitherto. The section on the Rubythroat ecology in BIRDS OF THE SOVIET UNION (Gladkov 1954) contains the laconic phrase "Information is wanting" and the first nests were found only in 1957 (Vinokurov 1961). Fragmentary data on the Himalayan Rubythroat biology can be found in some faunistic works (Yanushevich *et al.* 1960; Leonovich 1962; Kovshar 1964, 1966)². For this reason we consider it useful to publish some information on the mode of life of this bird based on observations made in Tien Shan (Zailyisky, Talassky and Kungay Alatau ranges), and available published data.

The Himalayan Rubythroat is widespread in the Tien Shan, being absent only in the western ranges of the Tien Shan—in Pskem and Ugam ranges (Korelov 1956a). It is scarce in Talassky Alatau where it occurs very sporadically, though in individual localities it is quite common: five nests being found and nests of two or three pairs could not be located in an area of 20 hectares in the upper course of the Kshi Aksu River. Rubythroat may occur in Chatkal range (Yanushevich *et al.* 1960). In Kirgizsky Alatau it is rare, seen approximately once in 10 days (Kuznetsov 1962a). It is uncommon in Sonkul, Moldotoo, Atbushi, Narym, Sary

¹ These observations refer in particular to the subspecies *bailloni* (Severtzov) of Russian and Chinese Turkestan, and northern Afghanistan. The race *bailloni* differs from our nominate West-Himalayan *pectoralis* (Gould) clinally only in colour saturation—the male averaging paler and less slaty above, the female more olive, less brown. But the species is migratory and the winter quarters of *bailloni* imperfectly known; it may well enter Indian limits. The breeding biology of the Rubythroat as a species is also imperfectly known, and this paper makes a useful contribution to the subject.—SA.

² See also Baker, E.C.S., 1933. NIDIFICATION OF BIRDS OF THE INDIAN EMPIRE, 2:81-2. Eds.

Dzhaz, Terskay and Kungay Alatau ranges, however, in individual regions there are quite a few. In the Burgan-Su ravine (Naryn range) for example seven males were seen during one day in end June, 1954 (Yanushevich *et al.* 1960), and in the ravines of the Chon-kysyl-Su (Terskay Alatau) at least five or six birds (mainly males) during a day trip (Stepanyan 1959). In Zailyisky Alatau, the Himalayan Rubythroat is not more numerous than one to two pairs per kilometre. In individual regions it is common and in some cases it can even be considered numerous taking into account the general scarcity of birds in the mountains. In the ravine of the Bolshaya Almatinka River, for instance, four pairs of the Rubythroat were found living in an area of about 10 hectares in 1967; this apparently being the maximum density in these regions. The species is not numerous in the upper course of the Tekes River (Vinokurov 1961) and very rare in Ketmen range : during two months only one singing male was seen in this locality (Korelov 1956b). It has been found in a number of places in Dzungarsky Alatau : on the southern slopes of the central part of the Altyn-Emel range and in the upper part of the Usek basin where it is common; also in the upper part of the Kok-Su and Bolshoi Baskan basins and in the northern part of the Myn-Chukur range. The Bolshoi Baskan basin is the most northern nesting place of this species hitherto known (Koreyev & Zarudny 1906; Kuzmina, in press). Thus the Himalayan Rubythroat is found in the western half of Tien Shan everywhere; lack of information on its nesting in individual ranges can be explained by the fact that the regions have not been explored properly.

In Tien Shan the Rubythroat lives mainly in thickets of Juniper-elfin. In Talassky Alatau range it lives at altitudes of 2500-2700 m. in the luxuriant thickets of creeping juniper with admixture of honeysuckle shrubs on comparatively gentle slopes covered with meadow herbage, most frequently in the upper courses of rivers. In Kirgizsky Alatau individual pairs nest even in mixed spruce forest in thick shrubs of barberry, dog rose, honeysuckle and juniper, at an altitude of 2100 m. and higher (Kuznetsov 1962b). In other ranges of Kirghizia it nests at altitudes of 3000-3500 m. in intermittent thick brushwood of creeping juniper and glades of subalpine meadows, leafy shrubs and individual spruce trees (Stepanyan 1959; Yanushevich *et al.* 1960). In Zailyisky Alatau, on the northern slopes of the range, the Rubythroat nests at altitudes of 2500-3000 m., sometimes even up to 3100 m. It lives here chiefly on the intermittent juniper stands and subalpine meadows or steppe-like grass-covered plots. Near the lower boundary of the nesting range (2500-2700 m.) it affects juniper and spruce open woodland where individual spruce groups alternate with luxuriant juniper thickets. In the central Tien Shan the species chiefly inhabits the thickets of creeping juniper and caragana,

but in valleys having rock outcrops and covered with brushwood the birds can be found as low as the upper¹ boundary of the spruce forest; nests have been found here at altitudes of 2900-3300 m. (Vinokurov 1961). In Dzungarsky Alatau range the birds live in the thickets of creeping juniper at altitudes of 1800-2400 m. (Koreyev & Zarudny 1906).

Thus in the Tien Shan the Himalayan Rubythroat lives chiefly in the thickets of high-mountain brushwoods, mainly of juniper, and is found only in small numbers in the upper part of the forest belt. It never nests beyond the upper boundary of the juniper stand. Its altitude range is 1800-3500 m., but in each discrete locality its vertical distribution is not wider than 500 m. The wide vertical range in the Tien Shan in general (1700 m.) is conditioned by climatic and floristic peculiarities of the individual mountain ranges and depends mainly on their geographic position and their exposure relative to the four cardinal points. To the south in the Pamiro-Alai the Rubythroat also lives above the upper boundary of the juniper-elfin wood, on luxuriant shrubless alpine meadows and is not found in the forest belt (Ivanov 1940; Leonovich 1962; Popov 1959).

The Himalayan Rubythroat is a migratory bird. It appears in the nesting sites after the snow has already melted on a substantial part of the slopes. It ascends the mountains and is then very rarely met with in the submontane regions and the plains. Only one occurrence of this kind is known: a male found in the young strip of forest near the Chokpar village of the Dzambul region on May 10, 1960. The birds do not concentrate during migration and are likely to fly by night.

Information on spring migration of the Himalayan Rubythroat is lacking because of the bird's unobtrusive behaviour during this period.

In the Kirgizsky Alatau range the species appears in late April or early May (Kuznetsov 1962b). The first birds were observed in the Zailysky Alatau on May 17, 1964, and on May 6, 1965. No further information is available on the time of arrival of the Rubythroat on its breeding grounds.

Immediately on arrival the males begin singing, choosing for this the tops of juniper shrubs, the apices of small and big fir-trees, more rarely stones or roofs of buildings; sometimes the male sings on the wing. The song is loud and clear and cannot be drowned even by the sound of mountain streams. When singing he drops his wings slightly, raises (sometimes almost vertically) and spreads his tail or keeps it folded. The bird turns his head in different directions resulting in the observer

¹ There must be a misprint in the work cited; for "the lower boundary of the spruce forest" read "the upper boundary...". One can hardly believe that Himalayan Rubythroat populate the whole spruce forest belt.

hearing sounds of varying intensities. The biological significance of the song lies not only in informing the female that the male is ready to breed, but in "marking" individual territory as well. Usually the male chooses some favourite situation at which he appears from time to time and sings, proclaiming his ownership of the territory. One of the males whose female was already laying eggs was observed singing during two hours (from 10 to 12 a.m.) from 19 points, and moving irregularly over this territory (an area of about one hectare). Most often he was singing from one point at a distance of 50-60 m. from the nest. If any other male entered the occupied site, the owner drove away the rival immediately. One day when we were inspecting a nest containing nestlings, the male drove off at once a neighbouring male that had come to investigate the anxious cries of the owners though the birds themselves were greatly excited by our intrusion.

Duration of singing from one point and its intensity vary, depending apparently on a number of factors. At the beginning of the nesting cycle (before hatching the young), in good weather, the males sing for as long as 10 minutes from one place, and at short intervals. When feeding the young, the males sing more seldom and the duration of the songs gets shorter (one to three minutes). During rain or snowfall the singing ceases but is resumed when the precipitation stops. Sometimes they sing when it is drizzling. The duration of the song is shorter in the middle of the day. The Rubythroat sings from early in the morning till dark; on June 29, 1967, the last song was heard at 21.05 hours in the twilight. No singing was heard at night. The calendar duration of the singing period is also long: in the Zailyisky Alatau the latest singing was heard on July 12, 1965, and on July 13, 1967 (apparently it was not the last song), and in the Talassky Alatau on August 4, 1960. This means that the vocal activity of the males continues for 2.5-3 months.

The Himalayan Rubythroat begins nesting soon after arrival on its breeding grounds. The participation of the sexes in nest-building is not clear; apparently the nest is built by the female alone since we never saw males fetching building material in their bills though we often saw them during this period.

The nests are located on the ground in small hollows. Of the 28 nests known at present in the Tien Shan, none was placed on a juniper shrub. The Himalayan Rubythroat is undoubtedly a ground-nesting species, therefore we consider the information of I. A. Abdusalyamov (1964) of the bird nesting on shrub-branches to be erroneous¹.

¹ Not only the location but the shape of the nest as well as the description of eggs have nothing in common with the nest and eggs of the species in question. One can clearly see from the photo there given that the nest belongs not to *Erithacus pectoralis* but rather to some warbler (*Sylvia* sp.?).

More frequently the nests are located on the steppe-like slopes near juniper-elfin wood or on small subalpine grass plots in thin juniper stands. They are placed under the cover of tussocks of *Festuca sulcata*, *Carex*, *Cobresia* or other plants, more rarely under the shelter of a stone. Sometimes the Rubythroat nests under thin juniper shrubs growing near thick juniper stands. The nests are placed both in the middle of a juniper shrub and under its outlying branches. We never found nests in large tracts of juniper stands. In the Talassky Alatau one nest was found inside a "hut" made of rough last years stalks of *Polygonum hissaricum*, and another was located on flat (practically horizontal) ground in high, thick, *Agropyrum* sp.; it was fixed to vertical stalks of the grass. Out of 22 nests found in the Talassky, Zailyisky and Kungay Alatau and along the upper course of the Tekes River, six nests were located under juniper shrubs; one under a honeysuckle shrub; three under stones; five under tussocks of *Festuca* sp.; four under tussocks of *Carex*, *Cobresia*, *Poa* and *Geranium*; three under the cover of other grasses. The nests located under the juniper shrubs cannot be seen, and the nests built under the cover of grass are screened by hanging leaves and are not visible. Only one nest (in the Talassky Alatau) could be seen well from above by a horseman riding by at a distance of some metres.

The nests are of two types. The more typical is the covered ball-like nest with the entrance on one side, very similar to a *Phylloscopus* nest. The other type is a normal cup-like nest open at the top. There are many variants intermediate between these two types: some nests have thin covers, covers of others are only half-built; sometimes the back part of the wall facing the slope is somewhat higher than others. Usually the open nests are built in juniper shrubs and under stones, i.e. when an effective roof is available, and the covered nests are built on the terrace slopes under the shelter of grass. There are many exceptions and data are still meagre to establish any correlation between the type of nest and the factors determining it. It is possible that the height above sea-level, the exposure of the slope and the time of building (beginning or middle of the summer) play a definite part in this respect.

The nest is built completely of last year's plants: for the outside part of nest rather rough stalks and leaves are used, sometimes with admixture of moss; the inner part is composed of finer and thinner material. The transition from the outer layer to the inner one is gradual and it is not always possible to separate them. A. A. Ivashchenko, who at our request identified the building materials of seven nests, reported that the birds had used 25 species of plants, the majority of the plants were used as admixtures, *Gramineae* being the most numerous.

The nest is rather massive and loosely built. It is 110-190 mm. in diameter (average of 9 nests 140 mm.), usually somewhat flattened on



Nesting site of the Himalayan Rubythroat

Above: Creeping Juniper, 2500 m. Talassky Alatau; *Below*: Upper boundary of Fir wood with Juniper bushes, 2700 m. Kungay Alatau.

(Photos: A. Kovshar)



1



2



3



4

(1) Nest on steppe slope; (2) Nest with clutch under Juniper Bush;
(3) Male, and (4) Female with food for nestlings.

(Photos: E. Gavrilov)

both sides and with an oval cross-section; it is 66-140 mm. high (average of 7 nests 113 mm.); diameter of nest-cup 55-90 mm. (average of 11 nests 72 mm.); depth 37-59 mm. (average of 7 nests 48 mm.). The entrance is 40-70 mm. wide and 35-60 mm. high.

The eggs are laid everyday. The full clutch consists of 4-6 eggs; of 12 full clutches nine comprised of four eggs, two of five, and one of six eggs. The egg shell is smooth, slightly glossy, of greenish-blue colour. The eggs are unicoloured or have small light rusty dots which form a slightly visible ring on the blunt end. Of seven clutches two contained unicoloured eggs and five of dotted eggs. 34 eggs measured $19.3-22.8 \times 14.5-16.3$ mm. (average 21.1×15.3 mm.). 16 slightly incubated eggs weighed 2.0-2.85 g. (average 2.4 g.); hard set eggs weighed 2.3 gm. on the average.

The eggs are incubated apparently only by the female. There are records (Yanushevich *et al.* 1960) of the male also taking part in incubation and possessing a brood patch, but we only observed females incubating when we inspected the nests. The incubation period was not determined.

The hatchlings are blind, covered with light-grey almost white down¹ about 2 mm. long growing in paired bunches on the back ulnar bend, nape (nearly on neck) and on the vertex; the corners of the mouth are white outside and yellow inside; mouth orange inside. Legs and bill flesh-coloured, claws white. On the day of hatching they weigh 2.3 gm. (three nestlings from one nest). The relationship between their growth and other development is similar to that in the majority of song birds: at first rapid increase in weight is observed, then the differentiation of plumage with simultaneous stopping of growth of the body. First the fine plumage of the abdominal part of the body appears, then the rusty ends of the head feathers develop, and after that the tips of the wing and tail quills appear. In nestlings weighing 15, 16.6 and 19.1 gm. the remiges began unfolding only on the second day when they weighed 16.2, 17.3 and 20.1 gm. respectively and had wings 24-30 mm. long. The next three days they did not increase in weight. Five nestlings in another nest weighing approximately the same (18.0, 18.7, 18.9, 19.4 and 21.0 gm.) had considerably larger wings (48-52 mm.) and were almost entirely covered with feathers; when disturbed they jumped out of the nest and scattered about hiding under stones and in thick grass.

The nestlings are fed by both parents. In the mornings on the first few days the female broods them and then brings food equally with the male. The degree of participation of male and female varies in different pairs; thus in one nest (the Talassky Alatau) the male visited the nest

¹ Information of A. A. Vinokurov (1961) that the nestlings of *Erithacus pectoralis bailloni* Sev. are naked is erroneous.

much more frequently than the female (65 times against 40 of 105 total fetchings). In another nest (the Zailyisky Alatau) the food was brought entirely by the female (the male never came to the nest during three hours of observation); in a third nest (Kungay Alatau) out of 37 food trips the male made 21.

The frequency of feeding is as follows. In 18 hours of observation during two days, the parents brought food 105 times to the nest containing three half-feathered nestlings (the Talassky Alatau), during the same period they carried off faecal sacs 30 times. The maximum number of feeding per hour was twelve; the minimum two (average six). The "working" day of this pair was about 16 hours, from dawn till 21.00 hours. During this time the birds brought to the nest about 100 portions of food weighing aggregately about 30 gm. Each of three nestlings weighing, 16-20 gm. thus received about 10 gm. of food a day, i.e. somewhat more than half their weight. In the Kungay Alatau the parents of four feathered nestlings made 37 visits with food in four hours (from 12.00 till 16.00 hrs.) and in the same time they removed seven faecal sacs.

In the Zailyisky Alatau E. V. Gvosdev observed a female fetching food for four one-week old nestlings every three to five minutes (three hours of observation), and in the Kirgizsky Alatau, according to the data of A. A. Kuznetsov (1962b), a pair brought food to the nest every two to five minutes.

They usually brought a single food item at a time, seldom two, and only on one occasion four items were extracted from a nestling's throat; a looping caterpillar, a spider and two little molluscs.

The birds collect the food mostly on the ground, on stones or under shrubs. They look for food within a radius of 150 m. from the nest, but very often much nearer—within three to five metres. They are very vigilant near the nest, especially the female. The arriving bird first alights on top of a neighbouring shrub for a while, peeping anxiously around and then jumps down to the ground and hops to the nest. If there is no danger the male flies directly to the nest without stopping anywhere. When carrying off a faecal sac the bird flies swiftly and without a stop, with short rapid wing strokes it takes the capsule rather far away, not less than 50 m., from the nest. When carrying no faecal sac the bird flies out of the nest and alights on one of the neighbouring bushes or other protruding object, and after looking about flies away as usual. The Ruby-throat feeds its young mainly upon caterpillars, often pilose ones. In the Talassky Alatau out of 81 food objects studied visually and according to the method of A. S. Malchevsky and N. P. Kadochnikov¹ (1953) 48

¹ Neck ligature and subsequent removal of food from the gullet.

represented Liparidae, Noctuidae, Geometridae and other caterpillars (including 30 pilose ones), the remaining items being locusts (15), beetles (6, including 4 Cerambycidae), lizards (*Ablepharus alaicus*, 6), Dermaptera, white butterfly, ants and Diptera (Muscidae and Asilidae : nymphs, pupae and imagines). Small and middle-sized *Ablepharus* lizards were fed entire, like insects, but of the bigger ones only the tails were used.

In the Zailyisky Alatau 35 food objects represented caterpillars (15), butterfly, beetles (5, including a small Tenebrionid), a spider, and the lizard (*Ablepharus alaicus*). In the Kirgizsky Alatau range mostly caterpillars were brought to the nest, once a pilose one (Kuznetsov 1962b). Thus in the different parts of its range in the Tien Shan, the Himalayan Rubythroat feeds its young mainly on large caterpillars, including pilose ones, and on a number of other invertebrates. Among vertebrates only *Ablepharus* lizards are used. After leaving the nest the young birds sometimes eat honeysuckle berries (August, Talassky Alatau).

The food of adult birds during the breeding period differs markedly from that intended for nestlings. In six stomachs examined in the Zailyisky Alatau between May and July were found remains of at least 45 invertebrates including 26 imago beetles (in all stomachs), one beetle larva, three noctuid caterpillars (in one stomach), two bugs of *Lygaeus* sp. (in one stomach), six ants (in three stomachs), one representative of other Hymenoptera, four Asilidae (in one stomach), one spider. The beetles were represented by Bruchidae, Jpidae, four *Aphodius*, six Elateridae, two Tenebrionidae, two Curculionidae and Chrysomelidae. The contents of 14 stomachs of adult Himalayan Rubythroats from the kirgizsky part of the Tien Shan (Peck & Fedyanina 1961) have been analysed. Most frequently they contained ants (64%) and remains of Curculionidae (57%). Less frequently were found remains of other beetles (Tenebrionidae, Lucanidae, Carabidae, Elateridae, Scarabaeidae, Coccinellidae), Heteroptera, Acrididae, caterpillars and molluscs. Seeds of Cruciferae and Polygonaceae were found only in one of the stomachs.

Thus the nestlings are fed mainly on large soft objects, the adult birds themselves living on smaller and coarse objects like beetles, ants and their food is generally more diverse.

How long the nestlings stay in the nest is not definite. On June 16 a nest contained nestlings about two-days old which left on June 30, i.e. when more than 14 days old. Another nest on June 16, contained nestlings with pinfeathers, which left the nest on June 27. Thus the young evidently stay in a nest not less than 15 days. After leaving the nest the young remain for some days in the immediate vicinity, but they do not spend the night in the nest (two broods observed in the Talassky and Zailyisky Alatau). They practically do not change in weight but their

plumage develops intensively especially the rectrices and wing-quills. When they leave the nest they can only flop about, but in two-three days they begin flying quite well. Thus one of the young weighing 19.4 gm. on the day of leaving the nest was caught two days later with difficulty at a distance of 20 m. from the nest; it could already fly 20-30 m.

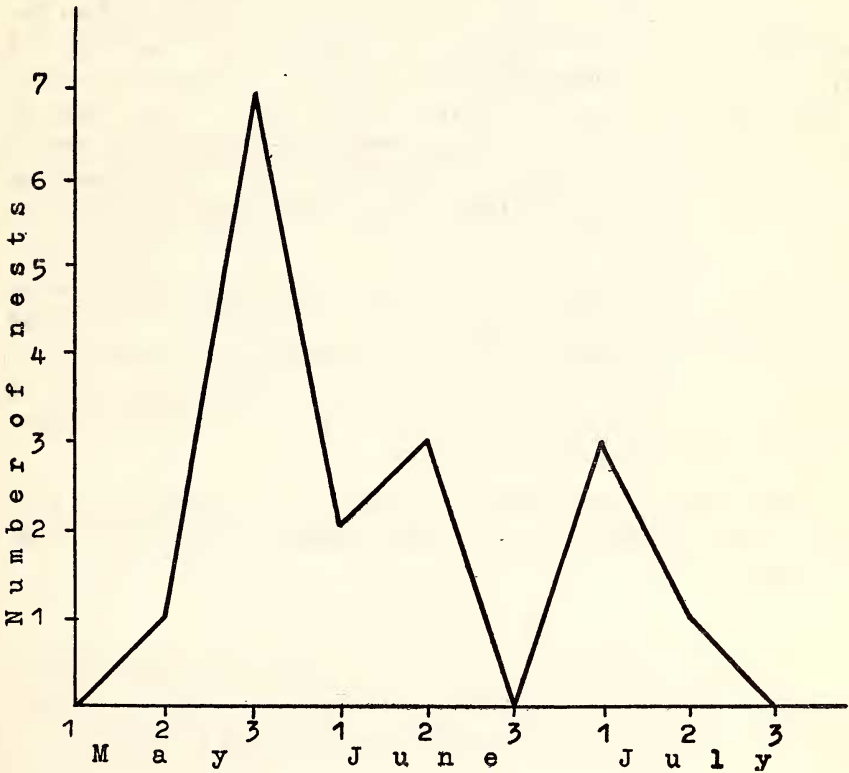
Most probably the broods disperse very soon since we never saw a strongly flying young being fed by its parents. This supposition is confirmed by the observation of a pair of birds in two nests which 14 days after the young had fledged, had laid a fresh clutch of three eggs in a new nest.

There is no information concerning the life of this species after the breeding season is over because of the unobtrusive behaviour of the birds at that time. There is little information on their departure. In the Zailiysky Alatau, in the ravine of the Malaya Almatinka River, Himalayan Rubythroats were met with in a thick aspen forest at an altitude of 1500 m. at the end of August (Shulpin 1939). In the Talassky Alatau the birds were still seen in the nesting sites on September 8 and 9, 1935 (Shulpin 1965). V. V. Shevchenko (1948) recorded that at the end of August, just after the first snowfall, the Himalayan Rubythroat migrated downhill and could be met with in swamp thickets and in juniper stands in ravines. Later, in September and October, especially in foul weather, they could be seen in the submontane orchards. This record, however, had not been confirmed by subsequent observations: during seven years' work in this region one of the present authors has never met with this species below the breeding range. In the Pamir, where the Himalayan Rubythroats do not breed, they are occasionally met with in August (Potapov 1966). Apparently the birds migrate in August, the last of them leaving early in September. In winter the species is not found in Tien Shan. The supposition of V. V. Shevchenko (1948) of their hibernation in warm winters in the Talassky Alatau has not been confirmed by facts.

The studies in the Tien Shan¹ have shown that the great majority of females begin egg-laying in the last third of May. The breeding period of the species is very long: fresh clutches can be found from the middle of May till the middle of July, i.e. during two whole months. This is partly due to the fact that the females do not start breeding simultaneously or synchronously but the chief reason is the repeat clutches, caused by destruction of nests and even second clutches. In 1967 a nest with slightly incubated clutch found on June 25 was destroyed the next day; in 12 days (on July 8) the same pair already had three fresh eggs (including one

¹ The following terms were taken into consideration: hatching—12 days, fledgling—15 days. Cases where the fledglings were taken care of by their parents are accounted as the nest (7 cases).

cuckoo egg) in a new nest at a distance of about 70 m. from the old one. On June 16 another nest was found containing nestlings covered with pinfeathers. On June 20 the female and the male were trapped and banded. On June 27 the young left the nest and thereafter we often met the banded male singing intensively in the neighbourhood. On July 11 we found that the banded female had laid three eggs in a new nest built at a distance of 45 to 50 m. from the first one. Thus, there is no doubt that the Himalayan Rubythroat breeds twice a year (i.e. it is double-brooded). In our case the female began the second laying 44 days after the beginning of the first oviposition (on May 26 and July 9). Of course not all pairs bring up the first brood successfully and start breeding again. The destruction of nests results in repeat-nesting and accounts for the fact that some birds bring up only one brood.



The breeding success of the Himalayan Rubythroat is shown by the following data. In the Zailiysky Alatau an average clutch consisted of 4.3 eggs (7 nests) of which 3.7 hatched (4 nests). For the Tien Shan as a whole these data are as follows: a clutch consists of 4.2 eggs (11 nests) of which 4.1 hatched (10 nests) and 3.8 young fledged. Added eggs and eggs with dead embryos are found very seldom; added eggs were